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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/372,879	08/12/1999	STEFANOS SIDIROPOULOS	RAMB-01014US0	1940

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EXAMINER	
FARAHANI, DANA	
ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 09/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/372,879	SIDIROPOULOS ET AL.	
	Examiner	Art Unit	
	Dana Farahani	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 June 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24 and 26-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24 and 26-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee et al., hereinafter Lee (U.S. 6,329,694).

Regarding claim 1, Lee discloses, figure 14, an integrated circuit device comprising: a conductive pad (I/O pad) to receive an input signal from an external signal line; a first doped region 61 of the first conductivity type disposed in a semiconductor substrate 50 of a second conductivity type, underlying and surrounding the conductive pad; a conductive region 65 of the first conductivity type underlying and surrounding the conductive pad disposed in the first doped region 61; a first tap region 66 spaced apart from and surrounding a substantial portion of the first doped region, wherein the first tap region is electrically coupled to a first supply voltage Vss; an output driver transistor, comprising segments 52, 53, and 54, having a drain region 54

and a source region 53, wherein the drain region is electrically coupled to the conductive pad; and a second tap region 66 surrounding the output driver transistor, wherein the second tap region is electrically and physically coupled to a second supply voltage Vss and the source region.

Regarding claim 2, the first and second supply voltages are ground (Vss).

Regarding claim 3, first tap region completely surrounds the first doped region.

Regarding claim 4, the first tap region is a discontinuous region.

Regarding claim 5, the doping concentration of the first doped region 61 is less than the doping concentration of the conductive region 65.

Regarding claim 6, the first tap region is a third doped region and the second tap region is a fourth doped region.

Regarding claim 7, the third doped region is of an opposite conductivity type than the first doped region.

Regarding claim 8, the fourth doped region is a P type doped region.

Regarding claim 9, a portion of the first tap region is decoupled from the first supply voltage to provide a predetermined equivalent series resistance between the first doped region and the first supply voltage.

Regarding claim 10, the first tap region substantially surrounds the first doped region.

Regarding claim 11, the first tap region is a discontinuous region.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 12-22, and 38-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee.

Regarding claim 12, Lee discloses the bond pad comprising conductive bonding layers 63-65; a first doped region 61 of the first conductivity type formed in semiconductor substrate 50 of the second conductivity type, underlying and surrounding the conductive bonding layer; a conductive region 65 of the first conductivity type disposed in the first doped region underlying and surrounding the bonding layer 63, the conductive region having a surface area; and a conductive tap region 66 spaced apart from and surrounding at least a portion of the first doped region, wherein a portion of the conductive tap region is electrically coupled to a supply voltage.

Lee does not disclose the surface region 65 substantially equal to the surface area of the conductive bonding layer. Note that by enlarging region 65 in order to equalize it with the conductive bonding region, region 65 would have to be enlarged to the extent that it would have make a direct connection to 64. since 64 and 65 are shorted together, the direct connection would have been another method to short these 64 and 65 together. Lee discloses at column 3, lines 8-12, that instead of metal strapping, the shortening of the layers can be carried out directly by using semiconductor material. Therefore, it would have been obvious to one of ordinary skill in

the art at the time of the invention to equalize 65 to the conductive bonding layer. A mere change in the size of a component is generally recognized as being within the level of ordinary skill in the art. See *In re Rose,* 105 USPQ 237 (CCPA 1955).

Regarding claim 13, the supply voltage is a ground voltage and the conductive bonding layer includes a metal (see column 4, lines 40-55).

Regarding claim 14, the doping concentration of the first doped region is less than the doping concentration of the conductive region.

Regarding claim 15, the conductive tap region is a third doped region and is of an opposite conductivity type than the first doped region.

Regarding claim 16, a portion of the conductive tap region is decoupled from the supply voltage to provide a predetermined equivalent series resistance between the doped region and the supply voltage.

Regarding claim 17, the conductive tap region is a continuous region.

Regarding claim 18, the conductive tap region substantially surrounds the doped region.

Regarding claim 19, the conductive tap region is a discontinuous region.

Regarding claim 20, the conductive tap region substantially surrounds the doped region in a concentric-like manner.

Regarding claim 21, the conductive region is polysilicon.

Regarding claim 22, the conductive tap region is a doped layer positioned beneath the conductive region.

Regarding claim 38-43, Lee discloses a conductive pad 63; a first doped region 61 of the first conductivity type disposed in a substrate of a second conductivity type, wherein the first

doped region is underlying and surrounding the conductive pad; a conductive region 65 of the first type having a first resistance disposed in the first doped region; and a first tap region 66 forms a second resistance. Although, Lee does not explicitly disclose the first and the second resistance are selected to provide a second frequency response of the bond pad structure that substantially matches the first frequency response, it would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the resistance of those regions, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 44 and 45, Lee substantially discloses the limitations in those claims, as discussed above, but does not explicitly disclose aluminum is used as the bond pad metal connection of the conductive pad. It would have been obvious to one of ordinary skill in the art at the time of the invention to use this metal as the contact metal, since Aluminum properties of excellent conduction of heat and electricity are well known in the art.

5. Claims 23, 24, 26, 27, and 29-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of the Japanese patent to Sakai et al. (document ID# 60000769).

Regarding claims 23, 29, and 30, Lee discloses transistor layout 22 in the circuit device in figure 14 having a bond pad (I/O), the transistor layout comprising a drain region 54 of the first conductivity type formed in a semiconductor substrate 50 of the second conductivity type, the drain region being electrically coupled to the bond pad; a source region 53; and a conductive tap region 55 spaced proximal to and surrounding the drain region, wherein the conductive tap region is electrically coupled to a supply voltage Vss and electrically and physically coupled to the source region.

Lee neither discloses the source and the drain region being of opposite conductivity types, nor discloses a section of the conductive tab region is structurally integrated with the source region.

The Japanese patent discloses, in figure 4c, wherein source and drain regions have both conductivity types regions in order to convey data (see the paragraph titled CONSTITUTION). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the source and the drain region of the opposite conductivity type, as the Japanese patent teaches, in order to be able to use Lee's invention in a memory device.

Lee discloses at column 3, lines 8-12, that shortening of the layers can be carried out by semiconductor, instead of the strapping shown in the figures. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to integrate the source and the tap region, as Lee teaches, in order to eliminate the need for metal strapping.

Regarding claim 24, the supply voltage is coupled to a ground voltage Vss. Although, Lee does not explicitly disclose aluminum is used as the bond pad metal connection, it would have been obvious to one of ordinary skill in the art at the time of the invention to use this metal as the contact metal, since Aluminum properties of excellent conduction of heat and electricity are well known in the art.

Regarding claim 26, the conductive tap region 55 is spaced proximal to and completely surrounds the drain region.

Regarding claim 27, the conductive tap region is a discontinuous region.

Regarding claims 31-37, Lee dose not disclose in the embodiment of figure 14 that a tap region spaced proximal to the drain region and electrically decoupled from the supply voltage and the conductive tap region.

Lee discloses in the embodiment of figure 21 that tap region 106 is decoupled from the conductive tap region and the supply voltage. It would have been within the level of ordinary skill in the art to make region 66 spaced proximal to the drain region and electrically decoupled from the supply voltage and the conductive tap region in order to make the embodiment shown in figure 21 of Lee.

6. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee as applied to claim 23 above, and further in view of Microelectronic Circuits by Sedra and Smith.

Lee discloses in figure 10, a plurality of source regions 13 and 23, where one of the source region of the plurality of source regions being electrically and physically coupled to the conductive tap region 25; a plurality of drain regions 24 and 14, where one of the drain region of the plurality of drain regions being electrically coupled to the bond pad; and wherein the conductive tap region is spaced proximal to and surrounds at least one drain region 24 of the plurality of drain regions.

Lee does not disclose the other drain and source regions are connected to the Vcc, or ground pad.

Sedra and Smith reference discloses in page 358, figure 5.3, that a source is grounded and a voltage is applied to a drain. It would have been obvious to one of ordinary skill in the art at the time of the invention to ground either source or drain of the MOSFET transistor, as the Sedra and Smith reference teaches, in order to interchange the source and the drain regions.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (571)272-1706. The examiner can normally be reached on M-F 9:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M Fahmy can be reached on (571)272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

D. Farahani

LONG PHAM
PRIMARY EXAMINER